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(19)

(54) TRANSPORT RESERVATION AND TICKETING SYSTEM

(71) We, INTERNATIONAL BUSINESS MACHINES CORPORATION, a Corporation organized and existing under the laws of the State of New York in the United States of America, of Armonk, New York 10504, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a transport reservation and/or ticketing system for example a railway seat reservation and/or ticketing system.

Computerized reservation and ticketing systems in the past have comprised a central host computer used to control a central data base and access to that data base. A number of remote terminals, normally consisting of a keyboard and a display or printer, were connected to the central computer. Whenever a ticketing/reservation clerk wished to make an enquiry or conduct a transaction, it was necessary for a connection to be established with the central computer so that the data base could be accessed.

Such an arrangement suffers from three disadvantages. Firstly the cost of establishing the connection between the remote terminal and the central computer is not inconsiderable and is increasing all the time. Secondly the time required to establish the connection adds to the response time of the clerk in answering a query or completing a transaction. Thirdly, the whole system is dependent upon the reliability of the communication links: if a communication link becomes broken, no transaction can be conducted by terminals connected to that link.

These disadvantages are mitigated in the ticketing system described and claimed in the Complete Specification of our co-pending Application for Letters Patent No 16749/74 (Serial No 1,437,883). In this ticketing system, a number of local data bases, which are subsets of the complete central data base, are established so that transactions can be completed without the need for accessing the central data base for every transaction. The cost of the local storage for the local data base and the cost of the local processor have to be set off against the saving in communication costs but in general faster response times represent increased productivity on the part of the ticketing/reservation clerk.

According to the present invention, a transport reservation and/or ticketing system comprises a host data processor containing a reservation and/or ticketing data base, and a plurality of local data processors connectible to the host processor and each connected to one or more ticketing terminals each terminal including a data entry unit and a display, the data base at the host processor including a full gazetteer which lists all possible origins and destinations in the transport system, each local processor including only part of the data base, and the part of the data base stored in the local processor including a local gazetteer listing only some of said possible origins and destinations, whereby during operation of a terminal an origin or destination can be displayed using either the local gazetteer or the full gazetteer from the host processor to enable selection of that origin or destination by means of the data entry unit.

A gazetteer is a geographic index consisting of a list of place names and serves as an index for referring to the origins and destinations contained within it.

The invention will now be particularly described, by way of example, with reference to the accompanying drawings, in which:—

FIGURE 1 is a schematic showing an overall ticketing system.

FIGURE 2 illustrates the structure of a data base for use in the system of FIGURE 1,

FIGURE 3 illustrates the logical configuration of a local subsystem,

FIGURE 4 is a flow chart illustrating how the data base is accessed,

FIGURE 5 is a flow chart illustrating how an alternative destination is selected,

FIGURES 6 to 9 are views showing various local subsets of the data base,

FIGURE 10 is a similar view showing in conjunction with FIGURE 6, how a destination which is not part of the local subset may be accessed,

FIGURES 11 to 13 are similar views illustrating how a destination may be selected from the central data base,

FIGURE 14 is a similar view showing an alternative technique for selecting a destination which is not part of the local subset, and

FIGURE 15 is a schematic showing how the data base is stored.

Referring now to FIGURE 1, which is a schematic of a ticketing system, a central host processor 1, for example an IBM (Registered Trade Mark) system 370/Model 145 computer, has a central data base 2 containing a complete ticketing data base. Data base 2 may be stored, for example on IBM (Registered Trade Mark) 3330 or 3340 disc files although any other bulk storage device could be used.

Connected to the host processor 1 through communications links 3 are local ticketing subsystems 4 which are located at each ticket issuing station in the network. The network might be constituted by a complete railway network. To allow tickets for other railway systems to be sold, host processor 1 may be connected through a communication link 5 to other processors 6 which in turn contain the data bases associated with their own network.

Each local subsystem comprises a controller 7, for example, an IBM (Registered Trade Mark) 3773 Model 2 Controller which contains an arithmetic logic unit 8, read only storage and random access memory 9, a communications adapter 10 for connecting the controller to the remote host 1, input/output adapters 11, and a storage file adapter 12. Connected to the input outlet adapters 11 are a number of data entry units 13: each data entry unit comprises a display screen 14 for passing messages to the ticketing clerk and for displaying details of the transaction being conducted, a number of keys or buttons 15 by which the clerk can enter data and/or initiate functions, and a printer 16 for issuing tickets when a transaction is completed.

Attached to the file adapter 12 is small data store 17 for storing a portion of the data base locally. Data store 17 may, for example, be a flexible magnetic storage disc file such as the IBM (Registered Trade Mark) Diskette. The size of the store 17 will determine the size of the local data base and this size must be weighed against its cost. The Complete Specification of our co-pending Application for Letters Patent No 10813/76 (Serial No 1504112) gives details of various storage management techniques for creating and organizing the local data base. However since these techniques do not form part of the present invention, no details are given herein although brief mention will be made later when the operation of the subsystem 4 is being described.

FIGURE 2 illustrates how the data base used in the ticketing system shown in FIGURE 1 is structured. The data base is built up from a number of pages or program segments in a tree structure as is described in detail in our Complete Specification No 1,437,883. Briefly however, page or program segment 21 represents the root of a data base for ticketing and from which other pages of the data base can be accessed. In addition, page 21 can be used to gain access to other pages 22 used to display pages from an enquiry or reservation data base Page 21 also contains pointers to pages 23 which are used to display place names, pages 27 which are used to display dates, and pages 24 which are used during the display of city pairs. In turn, pages or program segments 24 have pointers to other pages, for example pages 26 which are used to create alternative routes when there is a choice of route between a particular city pair and pages 25 which are used to display special fares.

FIGURE 3 shows the organization of the local subsystem 4. It is envisaged that where the controller is an IBM (Registered Trade Mark) 3773 Model 2 Controller, up to three data entry units can be connected to the controller. Within the controller is a flexible disc file 17 which consists of a floppy magnetic recording disc 32 continuously rotating in a vertical plane as indicated by arrow 33. The disc 32 is sandwiched between a magnetic recording head carried on arm 34 and a pressure pad carried on arm 35. The arms 34 and 35 can be moved along a radius of the disc 32 as shown by arrow 36 so as to access different tracks on the disc 32. When a particular track is accessed and information is stored thereon or read therefrom, the pressure pad on the arm 35 is moved towards the disc as indicated by arrow 37 to bring the magnetic recording surface into contact with the recording head. Such a disc store can hold up to 256K bytes of data in some 77 tracks. Details of the operation of the magnetic recording disc and the management of data stored thereon are not given in this specification since they do not form part of the present invention. However more detail

is given in the aforementioned Complete Specification of our Application No 10813/76 (Serial No 1504112).

Also located with the controller is a random access store 31. The store 31 is divided into a number of sections, that is display buffers 40, printer buffers 41, a page or program segment buffer 42, and a communication line buffer 43. Typical sizes for these buffers are 2,400 bytes for the display buffers 40, 600 bytes for the printer buffers 41, 600 bytes for the communication line buffer 43, and 10,000 bytes for the page buffer 42.

Movement of data with the subsystem 4 is controlled by means of a control unit 30. It will be appreciated that the control unit 30 can be a purpose-built hardware unit or it can consist of general purpose hardware configured and constrained to operate in a particular way by microprogramming techniques. Using an IBM (Registered Trade Mark) 3773 Model 2 controller, the control unit is configured using read only storage, random access storage and microcode in a similar manner to those known in the art. Since such microcode etc. does not form part of the present invention and is well within the scope of the competent system designer, no details are given within this specification.

At the heart of the control unit 30 is a supervisor 50 whose purpose is to control the overall operation of the different parts of the system. Data being read to and from the disc file 33 on line 39 are organized and controlled by means of a disc manager 38 which in turn is controlled by the supervisor 50 through a bus 56. In a similar manner, signals on line 51 from the buttons or keys 15 of the data entry unit are interpreted by a data entry unit manager 44 which in turn is supervised by the supervisor 50 through line 57. The data entry unit manager 44 also has the function of assembling data to be displayed within the display buffer 40 along line 52. Data within the buffer 40 are transmitted along line 68 to the displays 14.

Similarly, data to be printed in printer 16 are transmitted along line 69 from the print buffer 40 where they are assembled under control of a print manager 45 in turn supervised by the supervisor through bus 58. As was indicated earlier, communication with the host processor is through the communication buffer 43 which is loaded through line 55 by a communication line manager 49. Under control of the supervisor 50 through bus 63, line manager 49 ensures that data to be transmitted to the host processor or data received from the host are correctly formatted.

As will be described in more detail later, the bulk of the storage space on magnetic disc 32 is occupied with pages (program segments) from the data base. It also contains records of transactions which have been conducted on each terminal. As an alternative, a magnetic cassette recorder 65 could be used to record journal entries and similar sorts of information in which case the recorder 65 could be controlled by a cassette manager coming under the overall supervision of the supervisor 50 through line 67. The cassette recorder could be used instead of the disc file 17 to store pages but generally would be too slow for such a purpose.

As was indicated earlier, pages or program segments can be stored within the disc drive 17 or with the page buffer 42. Pages are loaded into and out of buffer 42 along line 54 under the control of a page manager 47 supervised along line 60 by the supervisor 50. Pages read from the buffer 42 are interpreted by a page interpreter 48 connected to the page manager 47 and the supervisor 50 by lines 61 and 62 respectively. As is now common with data processing equipment, the supervisor 50 can access a diagnostics unit 46 for utilizing diagnostics programs along line 59 when a fault develops within the subsystem: this aids a service engineer in determining which unit or component of the subsystem is faulty.

The operation and purpose of the various parts shown in FIGURE 3 will become clearer when typical uses are described with reference to FIGURES 4 to 14. As was explained earlier with reference to FIGURE 2, there are within the data base a very large number of pages which define city-pairs. Thus with "n" cities or stations in a transport system, there are $n(n-1)/2$ possible city-pair combinations. Thus in order to issue a ticket for any journey, a terminal must be able to locate any one of the $n(n-1)/2$ combinations. The speed with which a particular ticket can be generated will depend mainly on whether the corresponding city-pair page is stored locally or whether there is a need to access the data base at the central host processor. Storing all the city-pair pages locally is impractical since to do so would require too much local storage.

As was explained in the Complete Specification of our co-pending Application for Letters Patent Serial No 1,437,883, a number of subsets of the data base can be stored locally. If these subsets allow selection of the most popular city-pair combinations for that particular station, most tickets can be issued by accessing the local subset. However the number of stations in a local subset is typically about 50 so provision must be made for allowing

selection of other city-pair pages quite quickly.

Before describing the technique which forms a part of the present invention from the point of view of the ticketing clerk, reference will be made to FIGURE 4 which is a flow chart illustrating the functions performed by the supervisor 50, FIGURE 3, the page manager 47, FIGURE 3, and the disc manager 38, FIGURE 3.When the supervisor 50 determines that a page or program segment is required it requests the page manager 47 at 70 whether or not that particular page is in the random access memory 31. If the required page is in RAM 31, then it is accessed as at 71 for display or calculation.

If the required page is not in RAM 31, the supervisor 50 determines at 72 whether the page is in a look-aside table or directory which contains the address on the magnetic disc 17 of the most recently used or the most frequently used pages. If the required page is found in the look-aside table, it is immediately fetched at 73 by the disc manager 38 from the disc 33 and written into RAM 31 as at 77: the page can then be accessed as at 71.

If on the other hand it was determined at 72 that the page was not in the look-aside table, it is necessary to determine whether the page is stored on the disc or whether access to the host is necessary. Various techniques can be used and these are described in more detail in the Complete Specification of our co-pending Application No 10813/76 (Serial No 1504112). However a preferred technique is to perform a hashing operation on the number of the page required as at 74 and from this determine on which track on the disc 33 the page will be stored if it is present. Thus at 75 the track determined from the hash operation would be accessed and a determination would be made using the track directory to determine whether the page required was actually present. If the page is stored it can be fetched by the disc manager 38 as at 73. As an alternative, not shown, the page look-aside table and the hashing technique could be replaced with a single directory which can be searched immediately it is determined at 70 that the required page is not in RAM 31.

If it is determined that the required page is not stored in the disc store 17, the supervisor 50 causes the communication manager 49 to fetch the required page from the host as at 76. When the page is received from the host, it is immediately written into RAM 31 as at 77 for subsequent use. Simultaneously, the supervisor 50 causes the disc manager 38 to determine whether there is storage space in the appropriate track (if hashing is used) on the disc 32 as at 78. If there is sufficient space on the disc 32, the fetched page is written into the disc store 17 as at 79 by the disc manager 38. If there is insufficient space in the disc store 17 to store the fetched page, then space is created by deletion as at 80, of either the least recently used or the least frequently used pages provided these pages are not protected.

Thus when a page is required, the supervisor first causes the page manager 47 to determine whether the page is in RAM 31 then if necessary causes the disc manager 38 to determine whether the page is stored in the disc store 17, and then if necessary causes the communications manager 49 to fetch the page from the host. In a modification if it is determined that the required page is not in RAM 31, access can be initiated to the host as indicated by 81 whilst it is determined whether the page is in the disc store 17. The supervisor 50 in this case would cancel the request to the host if the page is first fetched from the disc store 17 or would cancel the request to the disc store 17 if the page is first fetched from the host. This would prevent the accumulation of delays which might occur should the host not be accessed until after it has finally been determined that the required page is not stored locally.

FIGURE 6 is the ticket clerk's view of a terminal. As can be seen, the display 14 is divided into four distinct, areas. Area 101 is a default or ticket area which normally contains the text or information which would be printed on the ticket when a print buttom 100 is pressed. Whenever a ticket is printed, a journal record containing at least the serial number and value will be stored on the disc file. Thus in the example shown, a single second-class adult ticket from Paris-Gare de Lyon to Besancon-Viotte would be printed were button 100 to be pressed. Areas 102, 103 and 104 on the other hand contain variable information which labels the keys 15 provided on the left-hand side, right-hand side and bottom respectively of the display 14. The keys 15 at the top of the display LS1, LS2, LS3 and LS4 are provided to enable the clerk to display four local subsets. The key BS is provided to allow the operator to backspace the display, for example to the root of the data base.

Should a passenger desire a ticket from Paris to Arles, for example, it would only be necessary for the clerk to press the key labelled "Arles" to set the terminal up for printing a ticket from Paris to Arles. FIGURES 7, 8 and 9 are similar views to FIGURE 6 except they display the other local subsets. The keys along the bottom are labelled in FIGURES 6 to 10 as 1 CL representing first class, 2 CL representing

second class, enf (enfant) representing child, simp (simple) representing single. A et R (allez et retour) representing return, PT (plein tarif) representing an ordinary fare, FN 30 (famille nombreuse 30%) representing a ticket with 30% discount for family groups, MIL CI representing a military ticket, and ABT 50 (Abonnement Titre III 50%) representing a season ticket with 50% discount. However, as will be seen later, the buttons can be programmed to represent other functions.

FIGURE 5 is a flow chart representing various ways in which a clerk can select a destination. First, the clerk determines at 85 whether the destination is on the display. As was mentioned above with reference to FIGURE 6, if the destination is on the display, it can be selected as at 86. If however the destination is not on the display, the clerk determines at 87 whether it is in another local subset. If it is, the other local subset is selected as at 88, the destination will be displayed and can be selected. If the destination is not in any of the local subsets, the clerk decides as at 89 whether the destination is in the local gazetteer. If it is then the local gazetteer can be selected as at 90: if it is not, then access must be made to the full gazetteer stored in the host.

It will be useful at this stage to comment on the nature of the gazetteer. The gazetteer consists of a number of pages or program segments which contain place name displays. The full gazetteer stored at the host enables any station name to be displayed on a display. The area or local gazetteer on the other hand consists of the most popular station names associated with the particular station at which it is stored. Thus there can be considered to be three classes of names, most popular names forming part of the local subsets and typically numbering 50, the next most popular names forming part of the local gazetteer and typically numbering some 130 to 150 names, and the least popular names which are located only in the full gazetteer. As was mentioned earlier, when a name is displayed, whether it is derived from the local subset, the local gazetteer or the full gazetteer, selection of it by the ticket clerk causes access of the appropriate city-pair page from the data base and allows the sale of tickets between this origin-destination pair.

If it is determined at 89 that the desired destination is not in the local gazetteer, the clerk backspaces as at 91 by pressing the key BS, FIGURE 6 until the ticketing root display is displayed on the screen. Then by selecting the key labelled "AUTRES DESTINATIONS", a first level index will be displayed as shown in FIGURE 11. By making the appropriate selection from the first level index as at 92 (FIGURE 5), a second level index is displayed (see for example FIGURE 12) and a selection from the second level index can be made as at 93 (FIGURE 5). This causes the appropriate page of the full gazetteer (shown for example in FIGURE 13) to be fetched from the host as at 94 (FIGURE 5).

If the destination is in the local subset or in the local gazetter, the choice of destination can be made without accessing the host. On the other hand if access must be made to the full gazetteer, one or two accesses may be needed. Although the root and the first level index would be stored locally, the second level index, because of its infrequency of use might not be stored locally in which case access to the host would be required. Since the full gazetteer would consume too much storage space and is frequently accessed, it would be stored at the host: however a recently used page from the full gazetteer would be stored locally.

Thus the use of a local gazetteer reduces the communication needs since many stations can be selected even though they are not in the local subsets. In addition, as will be clear from FIGURE 5, the ticket clerk can select non local subset stations more quickly if they are in the local or area gazetteer since in that event he does not have to backspace or make selections from the first and second level indices.

Also shown in FIGURE 5 is a modification which may allow quicker selection if the desired destination is not in the local subsets. Thus if a negative determination is made at 87, the clerk can immediately select the appropriate local gazetter page as at 95. This causes the appropriate part of the local gazetteer to be displayed (see for example FIGURE 14) and decision 96 can be made. However as will be seen with reference to FIGURE 14), apart from displaying an extract of the local gazetteer, the display also provides pointers along the bottom of the screen to the full gazetteer. These pointers correspond to the second level index. Thus if the destination is not in the local gazetteer, the appropriate pointer can be selected as at 97 to select the desired portion of the full gazetteer.

To save having to backspace to the root of the data base whenever a destination is not in any of the local subsets or the area gazetteer, pointers similar to those in the root, that is "AUTRES PROV" and "AUTRES DEST" representing other origins and other destinations respectively may be displayed in one or all of the local subsets. Thus, if the clerk wishes to select another origin or destination, he does not have to backspace to the root but can

merely cause the local subset shown in FIGURE 6 to be displayed. The button labelled "AUTRES PROV" or "AUTRES DEST" can then be selected to cause the first level index to be displayed.

Selection of a different origin is similar to the selection of a different destination except that in the embodiment described it is assumed that any changes in the towns displayed in the ticket area are being made to the destination rather than to the origin. In this embodiment therefore selection of a different origin (even if in the local subset or area gazetteer) would require backspacing to the data base route or the selection of the button labelled "AUTRES PROV" in local subset LS1, FIGURE 6. If, on the other hand, for a particular station the chances of a traveller buying a ticket with some other station as the journey origin were higher, then the terminal at that station could be programmed to operate slightly differently so that the clerk could indicate whether the origin or destination was being changed without reference to the data base root.

This operation of selecting a destination will now be described with reference to FIGURES 6 to 14. As was explained earlier, FIGURE 6 shows local subset 1 and if print button 100 is pressed a "default" ticket corresponding to that illustrated in ticket area 101 will be printed. If however the ticket clerk wished to select a different destination than Besancon-Viotte but still in subset 1, for example Arles, all that would be necessary would be for the clerk to press the button labelled Arles followed by the print button 100. Similarly, the type of ticket can be modified by pressing the appropriate button 15 along the button of the screen. Local subsets 2, 3 and 4 shown in FIGURES 7, 8 and 9 respectively are operated in the same manner.

Suppose however that the ticket clerk wishes to print a ticket to Avallon which is not in the local subset. All that is necessary is for him to press the arrowed button 15 in FIGURE 6 (labelled "autre A" or "other A") and the appropriate part of the area gazetteer will immediately be displayed as shown in FIGURE 10. By pressing the arrowed button 15 labelled "Avallon" in FIGURE 10 the Paris-Avallon city-pair page will be fetched either from the local store or the host. A ticket for Paris to Avallon will be printed when the print button 100 is pressed.

Now suppose that the ticket clerk wishes to print a ticket from Paris to Marsac. As will be seen from FIGURE 8, Marsac is not in the local subset. Neither is it in the area gazetteer. Therefore, the clerk backspaces with button BS until an entry "AUTRES DEST" is displayed as in the ticket root display. By selecting the "AUTRES DEST" button the first level index will be displayed, as shown in FIGURE 11. By pressing the button labelled M, the second level index will be displayed as shown in FIGURE 12. When the arrowed button is pressed, that is the button labelled "MARO A MARV", an extract from the full gazetteer will be fetched and displayed on the screen as shown in FIGURE 13.

By selecting the arrowed button 15 labelled Marsac (Dordogne), the ticket area 101 will display the new ticket information and this ticket can subsequently be printed. Incidentally also shown in FIGURE 13 is a button labelled "voir apres" which allows the clerk to display the next portion of the gazetteer.

FIGURES 8 and 14 illustrate the modification discussed with reference to FIGURE 5. In this case referring first to FIGURE 8, the arrowed button 15 (labelled "autre M") is pressed to cause the local gazetteer section shown in FIGURE 14 to be displayed. This time, as well as displaying a list of stations, the display also contains in area 104 pointers to the full gazetteer. By pressing the arrowed button 15, that section of the gazetteer containing names from MAN to MAZ will be displayed from which the appropriate selection can be made.

As indicated above, the Complete Specification of our co-pending application for Letters Patent No 10813/76 (Serial No 1504112) describes techniques for determining which pages of the data are to be stored locally and whether they are to be stored in the random access memory or in the disc file. It should be noted that pages controlling the display of the local subsets and the local or area gazetteer would always be stored locally. Therefore, these pages are protected from being dropped from storage by any convenient manner such as tagging.

If the local controller has sufficient storage space, each clerk may be provided with his own subsets and local gazetteer. However, less storage space will be used if all the clerks using terminals connected to the same controller were to use the same local subset and the same local or area gazetteer.

Where a transport system is divided into a number of areas or regions, for example, British Railways, it may be convenient for the local or area gazetteer to contain those names in the same area or region which are not contained in the local subsets.

FIGURE 15 is a schematic of the ticketing system described above. Data entry unit 13 allows the reservations/ticketing clerk to interact with the data base. The most recently used or most frequently used pages from the data base

are stored within the random access memory. The next most popular pages are stored in the local disc file 17. The disc file 17 has a number of protected tracks 17A containing the local subsets and the area gazetteer and a number of unprotected tracks 17B for storing pages fetched from the host store 2. The host store 2, of course, contains the full data base including all city-pair pages and a full gazetteer. As an example, the full gazetteer may contain approximately 3,400 names requiring some 200 pages in the data base. The area gazetteer may contain from 300 to 400 names requiring approximately 20 to 25 pages.

The pages (or program segments) are variable in size and can contain from 8 to 1,024 bytes of data depending on the amount of data they contain. The IBM (Registered Trade Mark) Diskette floppy magnetic disc typically contains 77 tracks each capable of storing 28 sectors of 128 bytes each. The local subsets and the area gazetteer are contained in 8 protected tracks and with the disc manager back up occupying 4 tracks and the journal and cash balance occupying up to 18 tracks, this leaves some 47 tracks available for storing pages fetched from the host data base.

WHAT WE CLAIM IS:—

1. A transport reservation and/or ticketing system comprising a host data processor containing a reservation and/or ticketing data base, and a plurality of local data processors connectible to the host processor and each connected to one or more ticketing terminals, each terminal including a data entry unit and a display, the data base at the host processor including a full gazetteer which lists all possible origins and destinations in the transport system, eac local processor including only part of the data base, and the part of the data base stored in the local processor including a local gazetteer listing only some of said possible origins and destinations, whereby during operation of a terminal an origin or destination can be displayed using either the local gazetteer or the full gazetteer from the host processor to enable selection of that origin or destination by means of the data entry unit.

2. A system as claimed in claim 1, wherein the part of the data base stored at a local processor includes a local subset enabling display and selection of the most popular destinations and/or origins without reference to either gazetteer, wherein the local gazetteer stored at that local processor lists the next most popular origins and destinations, and wherein the least popular origins and destinations are listed only in the full gazetteer.

3. A system as claimed in either preceding claim, comprising means for simultaneously displaying a pointer to the full gazetteer whilst displaying the local gazetteer whereby the full gazetteer can be selected if the desired origin or destination is not in the local gazetteer.

4. A system as claimed in any preceding claim, comprising means for connecting said host processor to at least one further host processor containing a different data base.

5. A transport reservation and/or ticketing system, substantially as herein described with reference to the accompanying drawings.

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Agent for the Applicants.

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1504113 COMPLETE SPECIFICATION
15 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

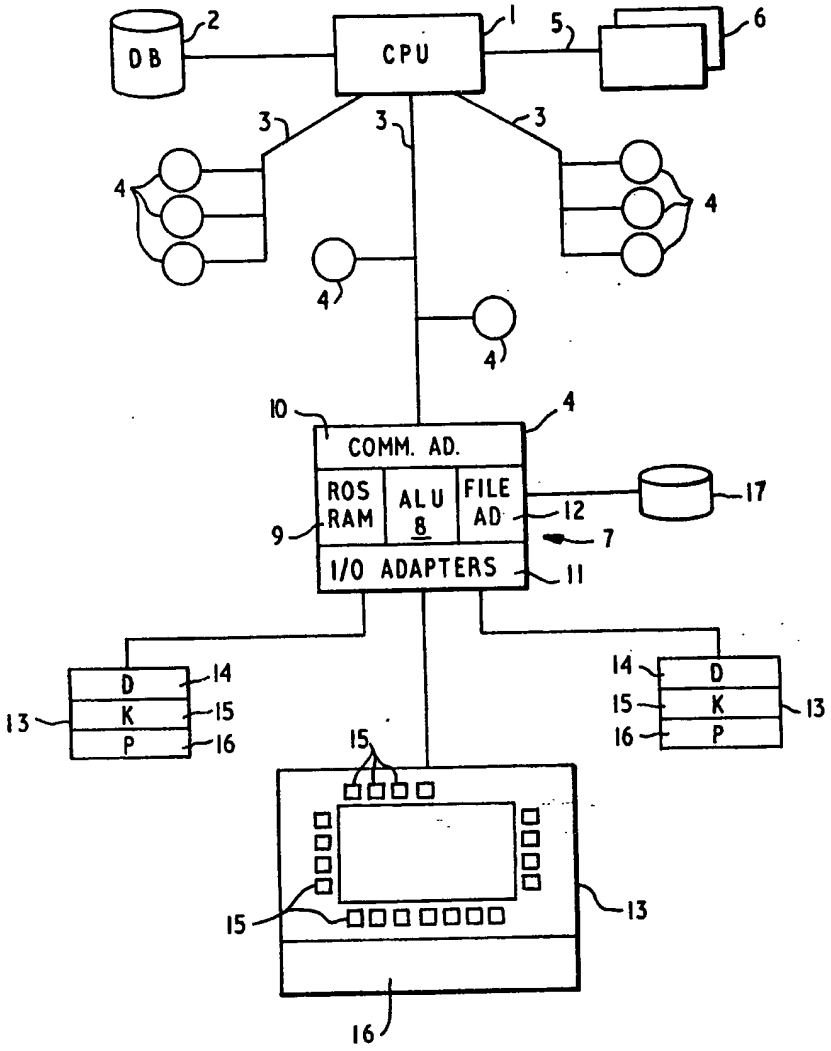

FIG. 1

1504113 COMPLETE SPECIFICATION
15 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

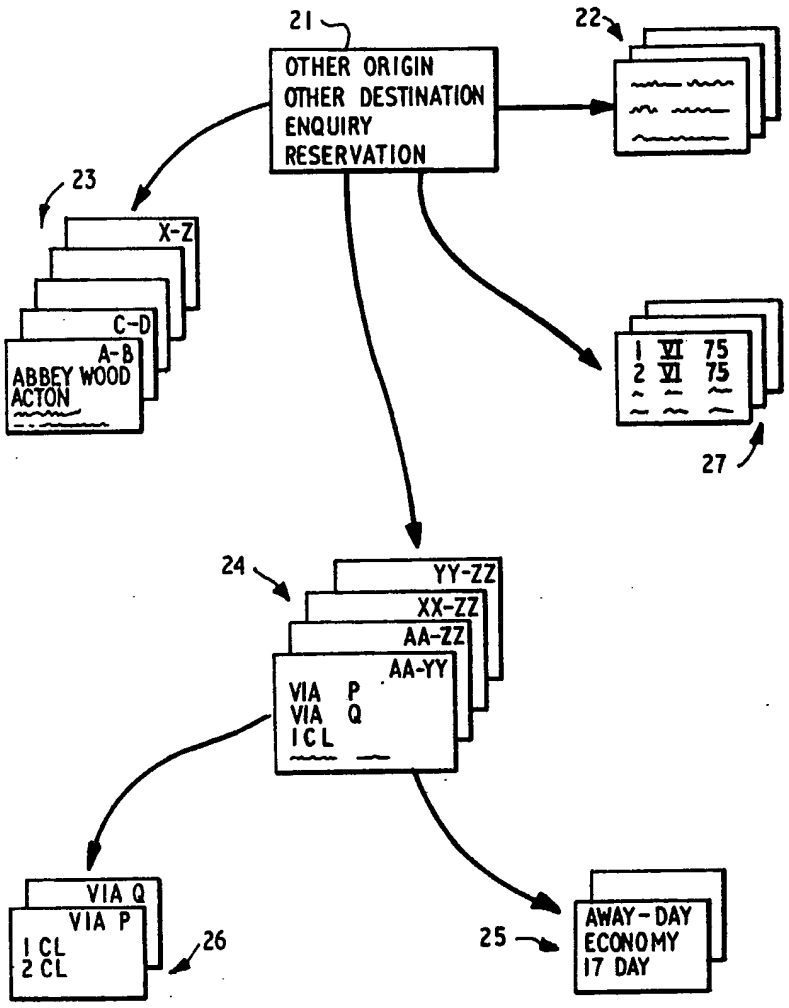

FIG 2

1504113 COMPLETE SPECIFICATION
15 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 3

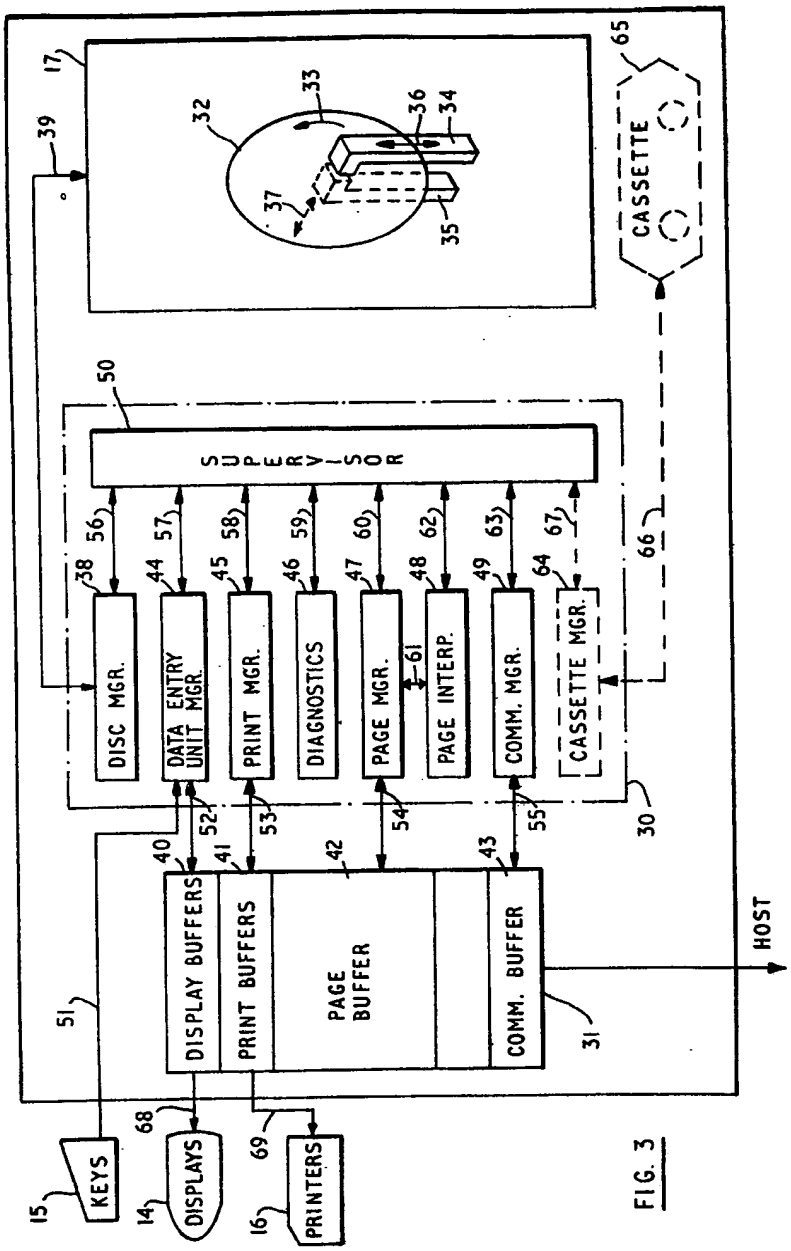

FIG. 3

1504113 COMPLETE SPECIFICATION
15 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 4

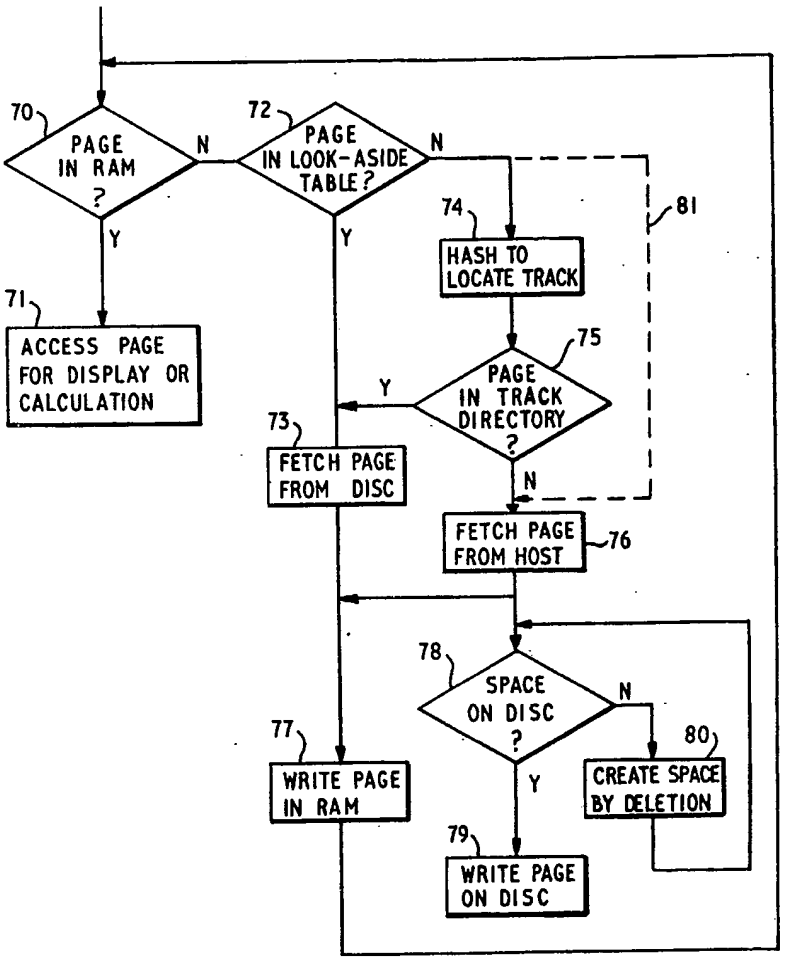

FIG. 4

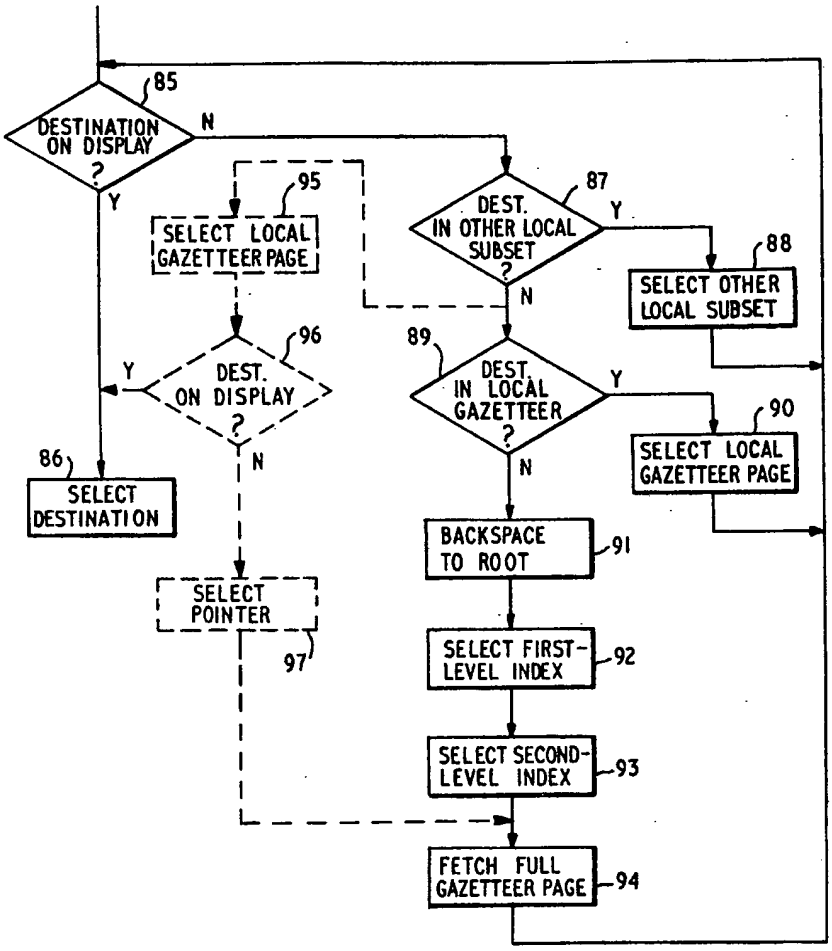
85
DESTINATION ON DISPLAY ?
N
Y
95
SELECT LOCAL GAZETTEER PAGE
87
DEST. IN OTHER LOCAL SUBSET ?
Y
88
SELECT OTHER LOCAL SUBSET
N
96
DEST. ON DISPLAY ?
Y
N
89
DEST. IN LOCAL GAZETTEER ?
Y
90
SELECT LOCAL GAZETTEER PAGE
N
86
SELECT DESTINATION
BACKSPACE TO ROOT
91
SELECT POINTER
97
SELECT FIRST-LEVEL INDEX
92
SELECT SECOND-LEVEL INDEX
93
FETCH FULL GAZETTEER PAGE
94

FIG. 5

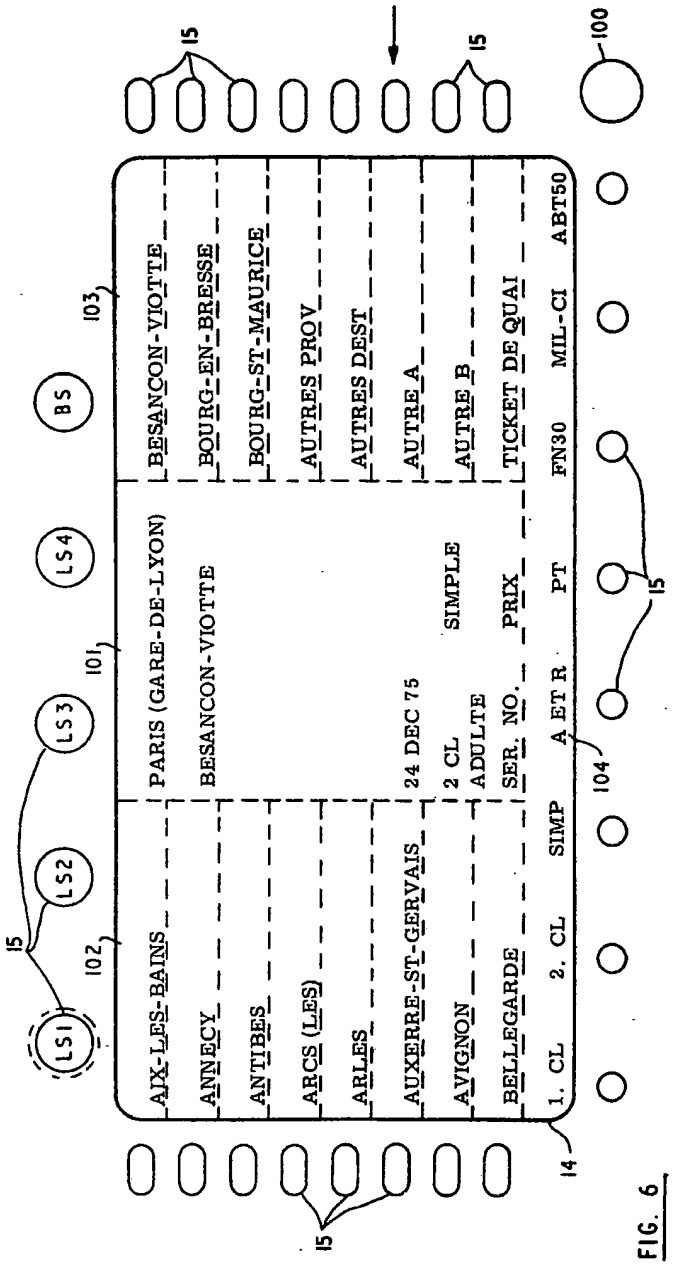
AIX-LES-BAINS
ANNECY
ANTIBES
ARCS (LES)
ARLES
AUXERRE-ST-GERVAIS
AVIGNON
BELLEGARDE
1. CL
2. CL
SIMP
PARIS (GARE-DE-LYON)
BESANCON-VIOTTE
24 DEC 75
2 CL
ADULTE
SER. NO.
A ET R
SIMPLE
PRIX
PT
BESANCON-VIOTTE
BOURG-EN-BRESSE
BOURG-ST-MAURICE
AUTRES PROV
AUTRES DEST
AUTRE A
AUTRE B
TICKET DE QUAI
FN30
MIL-CI
ABT50
LS1
LS2
LS3
LS4
BS
100
101
102
103
104
14
15

FIG. 6

1504113
15 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale

Sheet 7

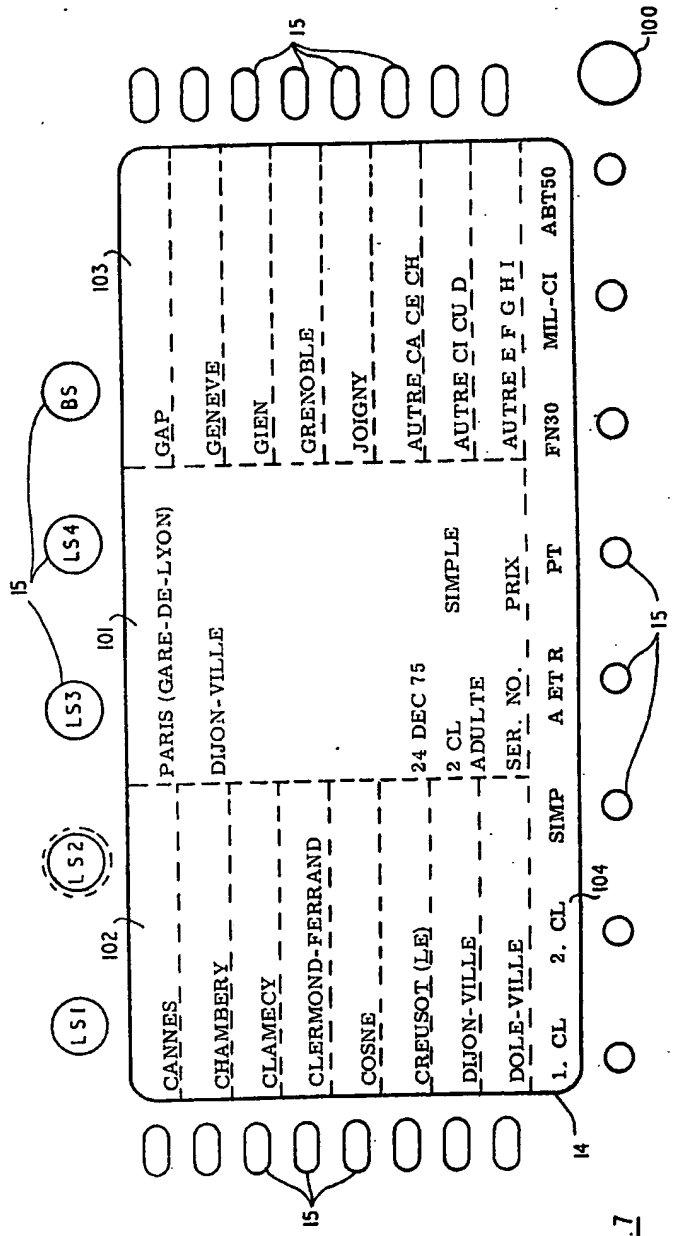

FIG.7

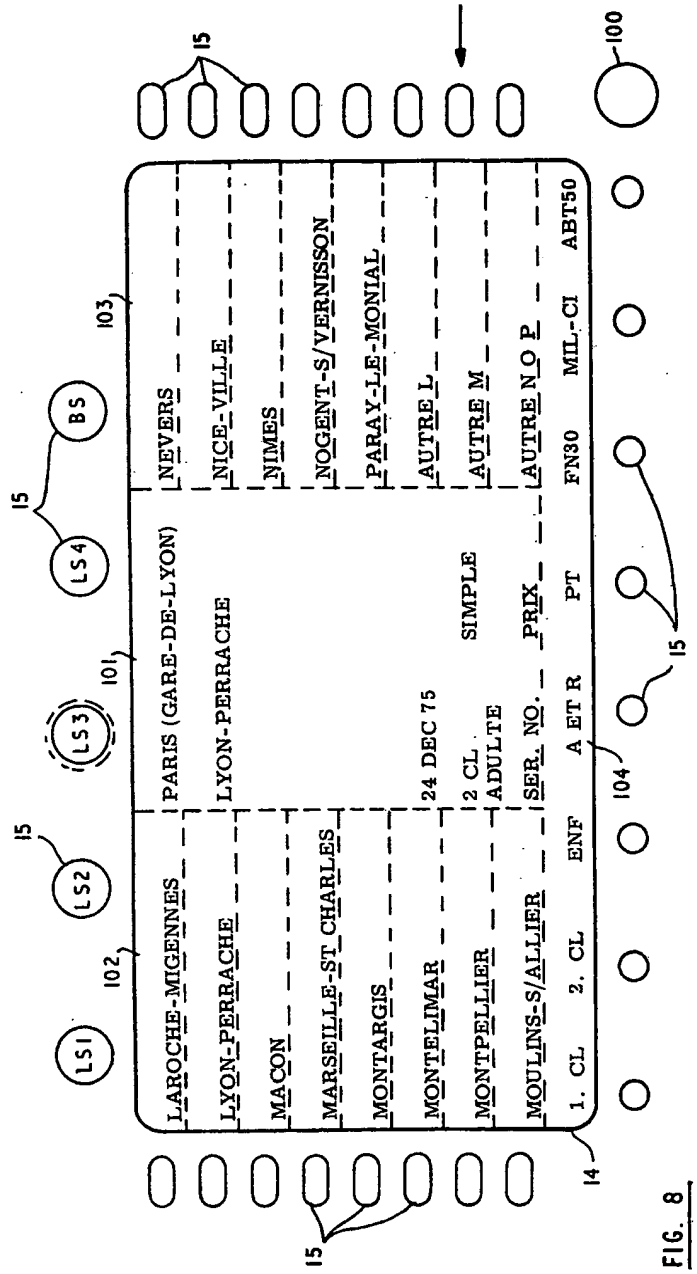
LS1
LS2
LS3
LS4
BS
15
101
102
103
104
100
14
LAROCHE-MIGENNES
LYON-PERRACHE
MACON
MARSEILLE-ST CHARLES
MONTARGIS
MONTELIMAR
MONTPELLIER
MOULINS-S/ALLIER
PARIS (GARE-DE-LYON)
LYON-PERRACHE
24 DEC 75
2 CL
ADULTE
SIMPLE
SER. NO.
PRIX
1. CL
2. CL
ENF
A ET R
PT
NEVERS
NICE-VILLE
NIMES
NOGENT-S/VERNISSON
PARAY-LE-MONIAL
AUTRE L
AUTRE M
AUTRE N O P
FN30
MIL.-CI
ABT50

FIG. 8

1504113
15 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale

Sheet 9

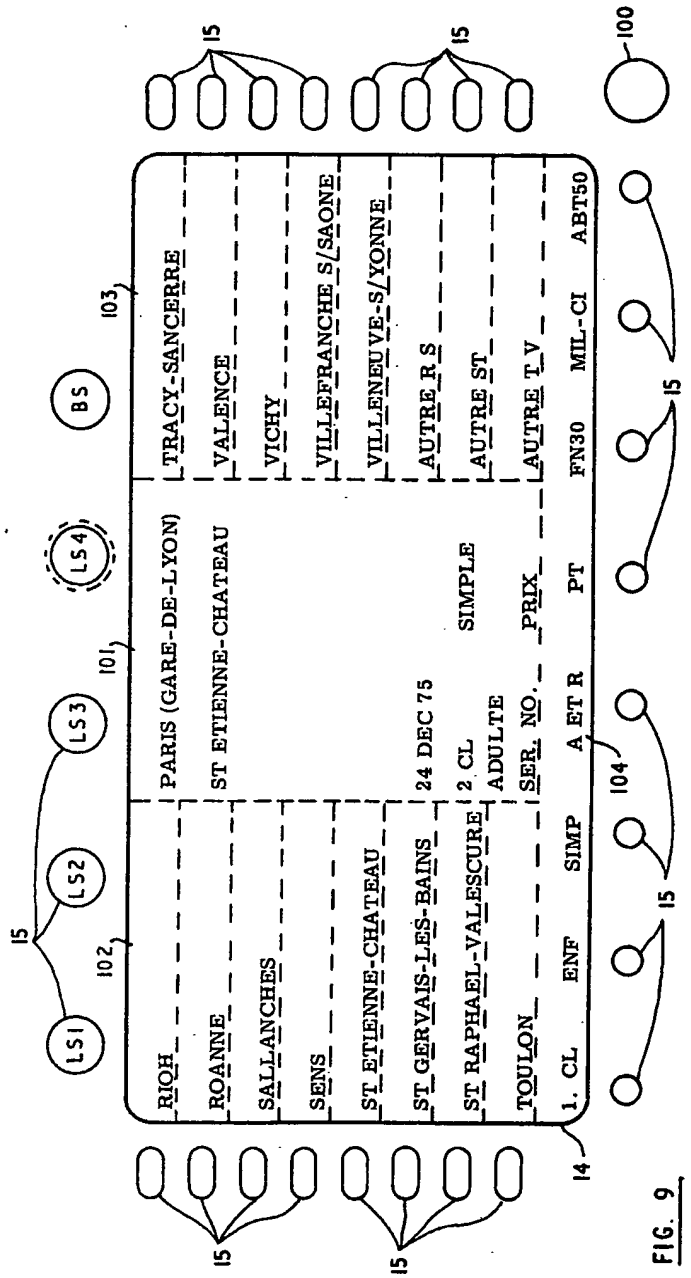

FIG. 9

1504113 COMPLETE SPECIFICATION
15 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 10

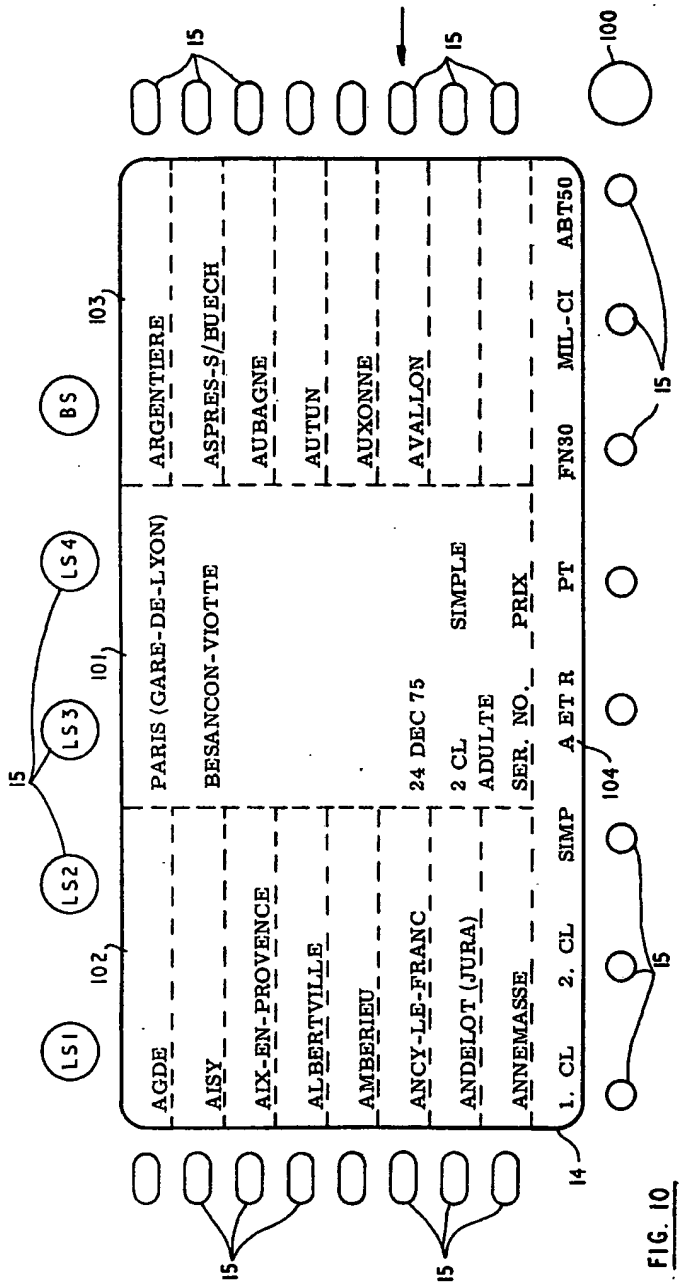

FIG. 10

1504113 COMPLETE SPECIFICATION
15 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 11

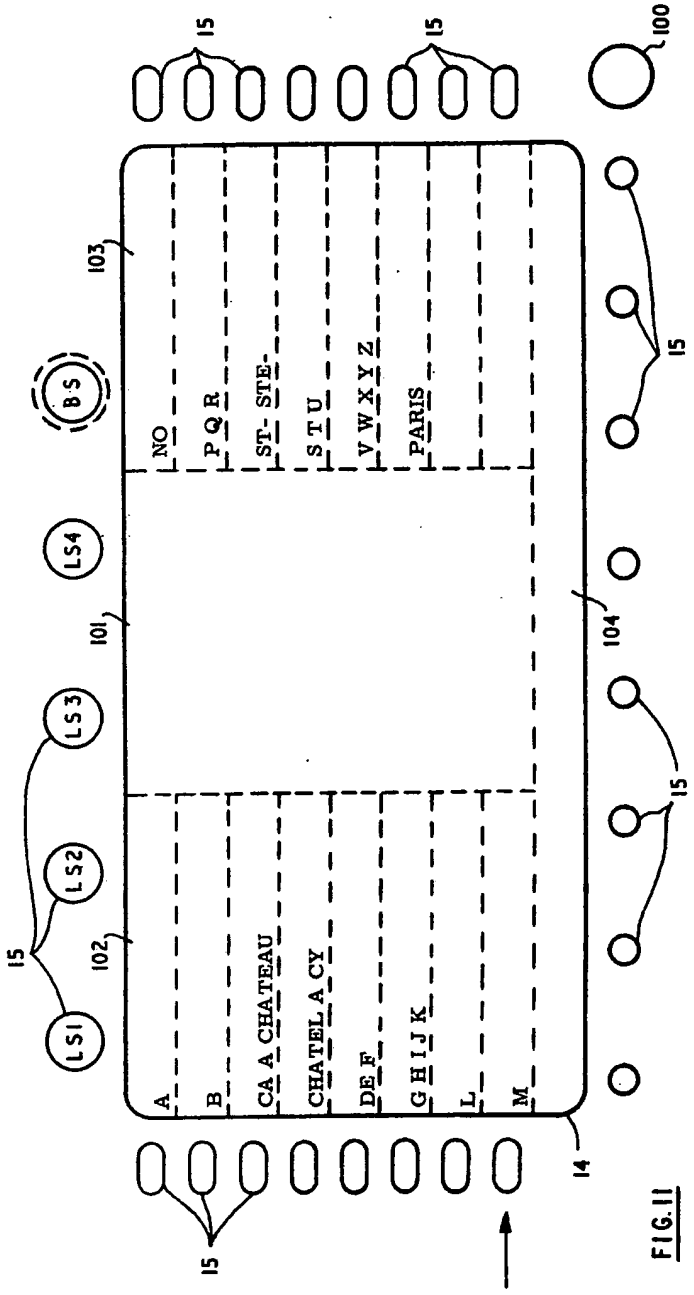

FIG. 11

1504113 COMPLETE SPECIFICATION
15 SHEETS

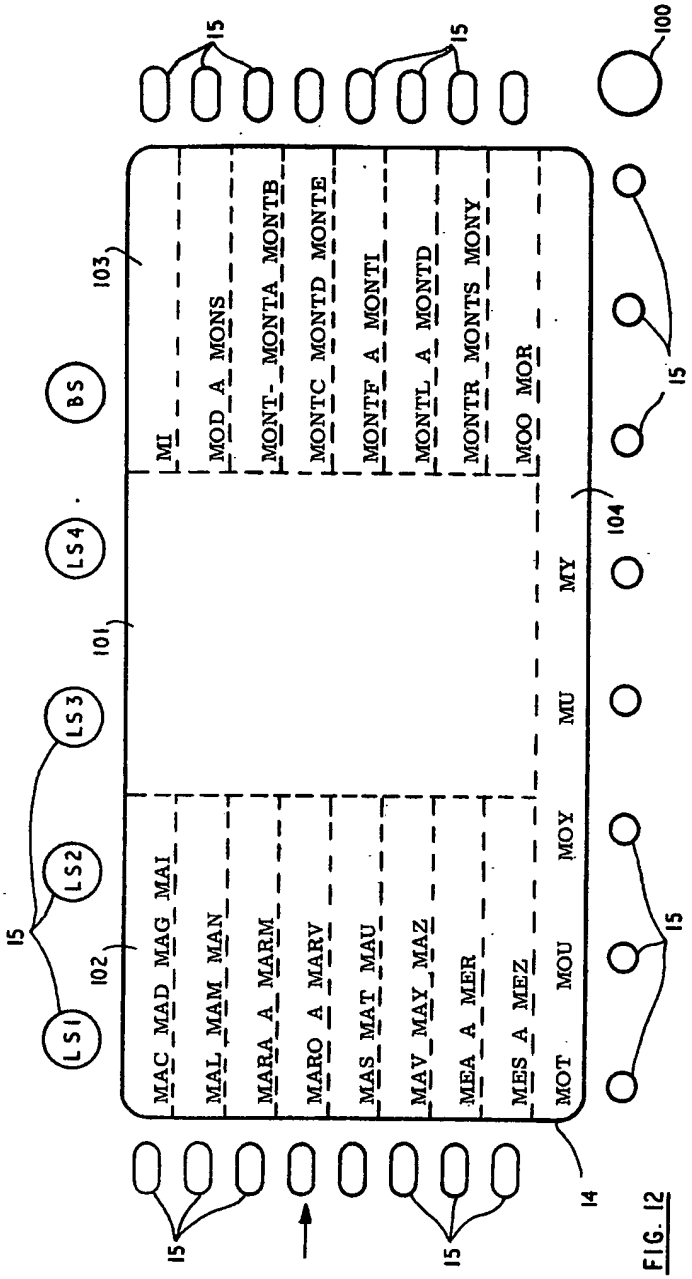

FIG. 12

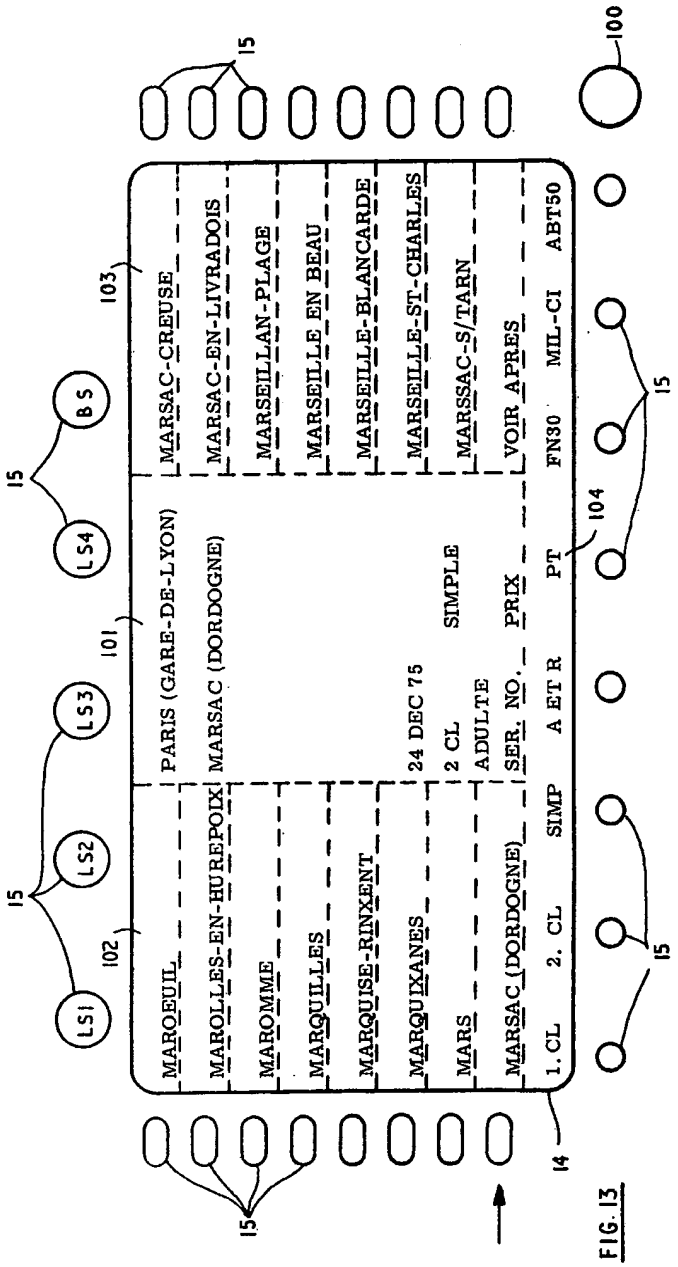
MAROEUIL
MAROLLES-EN-HURREPOIX
MAROMME
MARQUILLES
MARQUISE-RINXENT
MARQUIXANES
MARS
MARSAC (DORDOGNE)
1. CL
2. CL
SIMP
PARIS (GARE-DE-LYON)
MARSAC (DORDOGNE)
24 DEC 75
2 CL
ADULTE
SIMPLE
SER. NO.
A ET R
PRIX
PT
MARSAC-CREUSE
MARSAC-EN-LIVRADOIS
MARSEILLAN-PLAGE
MARSEILLE EN BEAU
MARSEILLE-BLANCARDE
MARSEILLE-ST-CHARLES
MARSSAC-S/TARN
VOIR APRES
FN30
MIL-CI
ABT50
LS1
LS2
LS3
LS4
BS
100
101
102
103
104
14
15

FIG. 13

1504113
15 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale

Sheet 14

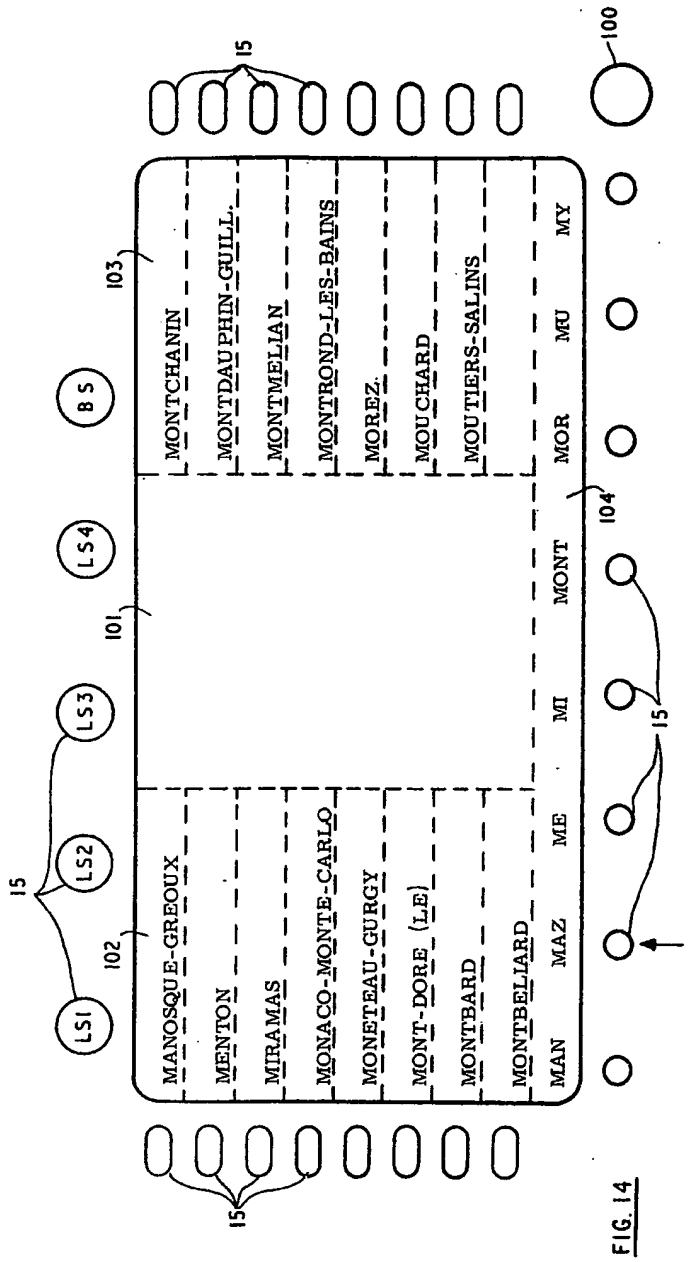

FIG. 14

1504113 COMPLETE SPECIFICATION
15 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 15

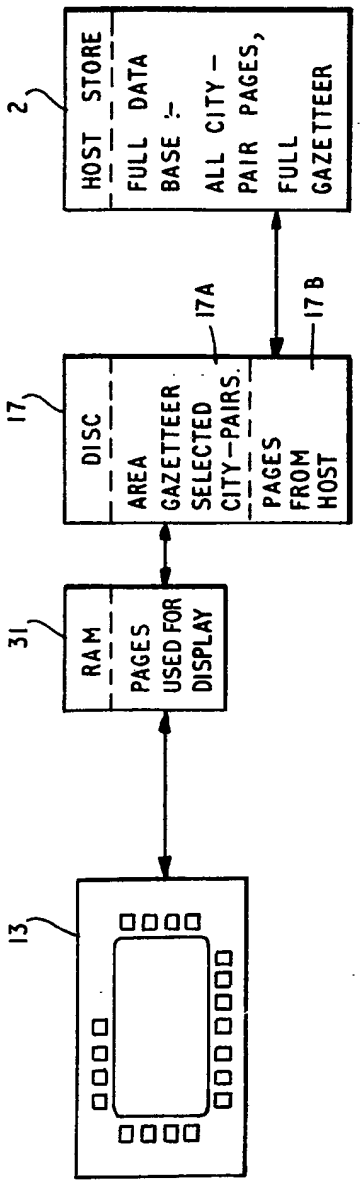

FIG. 15